SBSE CD 015
Index Sheet 1 of 3

Slideset companion to:
Heating, Cooling, Lighting: Design Methods for Architects - Part 2 of 2
Second Edition, John Wiley & Sons, Inc, 2001
Norbert Lechner
Slides 1-93 **Please note that this slide set is continued from SBSE CD014

Slide #: **001** *Author ID:* 12.1a *SBSE Slide ID:* CD015-001-S001-105
Title: Figure 12.1a, (Page 326)
Comments: Low sunken relief is ideal for the very bright and direct sun of Egypt. (Courtesy of the Egyptian Tourist Authority.)

Slide #: **002** *Author ID:* 12.1b *SBSE Slide ID:* CD015-002-S001-106
Title: Figure 12.1b, (Page 327)
Comments: High relief is modeled well by the direct sun of Greece.

Slide #: **003** *Author ID:* 12.1c *SBSE Slide ID:* CD015-003-S001-107
Title: Figure 12.1c, (Page 327)
Comments: The cloudy and subdued lighting of northern Europe allows highly sculptured forms. Even when the sun does come out, as in this photograph, it is not so intense that details are lost in dark shadows. (Photograph by Nicholas Davis.)

Slide #: **004** *Author ID:* Color Plate 5 *SBSE Slide ID:* CD015-004-S001-108
Title: Color Plate 5, (Page 332.5)
Comments: This photograph of the main lobby in the Menil Collection in Houston, Texas, clearly demonstrates how much cooler north lighting is than sunlight. The skylight over the lobby is partially shaded by the 2 story portion of the museum on the left. The shaded section of the skylight is, therefore, only illuminated by the blue sky. The other portion at the far right is illuminated by both the blue sky and the warm sunlight. Also note the reddish white light produced by incandescent lamps in the side corridor.

Slide #: **005** *Author ID:* 12.6h *SBSE Slide ID:* CD015-005-S001-109
Title: Figure 12.6h, (Page 338)
Comments: Venetian blinds are often disturbing, because of the figure/background confusion.

Slide #: **006** *Author ID:* 12.8c *SBSE Slide ID:* CD015-006-S001-110
Title: Figure 12.8c, (Page 341)
Comments: Fragile artifacts from ancient Egypt are brightly illuminated by only 4 footcandles of illumination because of the very dark background. (Courtesy of Memphis State Photo Services, Memphis State University, TN.)

Slide #: **007** *Author ID:* 12.10c *SBSE Slide ID:* CD015-007-S001-111
Title: Figure 12.10c, (Page 344)
Comments: Although this room has more than enough illumination on the horizontal work surface, it appears dark because of the low brightness of the vertical surfaces. (Photograph by James Benya.)

Slide #: **008** *Author ID:* 12.10d *SBSE Slide ID:* CD015-008-S001-112
Title: Figure 12.10d, (Page 344)
Comments: Additional illumination on the vertical surfaces makes this room appear as well illuminated as the table actually is. (Photograph by James Benya.)

Slide #: **009** *Author ID:* 12.13g *SBSE Slide ID:* CD015-009-S001-113
Title: Figure 12.13g, (Page 350)
Comments: It is impossible to appreciate this glass-covered work of art in a famous museum because of the reflected glare and veiling reflections.

Slide #: **010** *Author ID:* 12.14a *SBSE Slide ID:* CD015-010-S001-114
Title: Figure 12.14a, (Page 352)
Comments: An elevator lobby or reception area can become the focus for direction by making it brighter than the corridor leading to it. (Photograph courtesy of Hubbell/Lighting Division.

Slide #: **011** *Author ID:* 12.14d *SBSE Slide ID:* CD015-011-S001-115
Title: Figure 12.14d, (Page 353)
Comments: An all indirect lighting scheme creates a feeling of gloom. (Photograph by James Benya.)

Slide #: **012** *Author ID:* 12.14e *SBSE Slide ID:* CD015-012-S001-116
Title: Figure 12.14e, (Page 353)
Comments: A cheerful and interesting lighting design is achieved by the combination of direct, indirect, and accent lights. (Photograph by James Benya.)

Slide #: **013** *Author ID:* 12.14g *SBSE Slide ID:* CD015-013-S001-117
Title: Figure 12.14g, (Page 354)
Comments: Light-colored buildings can be a source of gentle, diffused area lighting at night. (Courtesy Spaulding Lighting, Inc.)

Slide #: **014** *Author ID:* 12.17a *SBSE Slide ID:* CD015-014-S001-118
Title: Figure 12.17a, (Page 355)
Comments: Direct glare from bright lighting fixtures is not a problem with an indirect lighting system. The whole ceiling becomes a low brightness source. (Courtesy, © Peerless Lighting Corporation.)

Slide #: **015** *Author ID:* 12.17b *SBSE Slide ID:* CD015-015-S001-119
Title: Figure 12.17b, (Page 356)
Comments: This artwork is highlighted by reducing the background brightness. MIT Chapel by Eero Saarinen.

Slide #: **016** *Author ID:* 12.18b *SBSE Slide ID:* CD015-016-S001-120
Title: Figure 12.18b, (Page 357)
Comments: Pneumatic structures with translucent membranes are an example of well-integrated designs. These structures provide daylight without visual "noise", and at night work well with indirect lighting. (Courtesy of Tensar Structures, Inc.)

Slide #: **017** *Author ID:* 13.1b *SBSE Slide ID:* CD015-017-S001-121
Title: Figure 13.1b, (Page 360)
Comments: Groin vaulting and flying buttresses allowed Gothic cathedrals to have windows where there had been walls.

Slide #: **018** *Author ID:* 13.1c *SBSE Slide ID:* CD015-018-S001-122
Title: Figure 13.1c, (Page 361)
Comments: Harwick Hall, Derbyshire, England, 1597. (From Mansions of England in Olden Times, by Joseph Nash, Henry Sotheran & Co., 1871.)

Slide #: **019** *Author ID:* 13.1e *SBSE Slide ID:* CD015-019-S001-123
Title: Figure 13.1e, (Page 361)
Comments: The Bradbury Building, Los Angeles, 1893, has a glass-covered atrium as the circulation core. Delicate ironwork allows light to filter down to the ground level. The building was cooled by natural ventilation. Air entered exterior windows, passed through transoms and interior windows facing the atrium, and then left through hopper windows just below the skylight.

Slide #: **020** *Author ID:* 13.1f *SBSE Slide ID:* CD015-020-S001-124
Title: Figure 13.1f, (Page 362)
Comments: The Guggenheim Museum, New York City, 1959, by Frank Lloyd Wright uses a glass-domed atrium for diffused daylighting.

Slide #: **021** *Author ID:* 13.1g *SBSE Slide ID:* CD015-021-S001-125
Title: Figure 13.1g, (Page 362)
Comments: Continuous strip windows bring additional daylight to the gallery space. (Courtesy of New York City Convention and Visitors Bureau, Inc.)

Slide #: **022** *Author ID:* 13.1h *SBSE Slide ID:* CD015-022-S001-126
Title: Figure 13.1h, (Page 363)
Comments: The Johnson Wax Administration Building, Racine, WI 1939, by Frank Lloyd Wright. Note the skylights between the mushroom columns, as well as the glazing at the junction of roof and walls. The two circular shafts (center left) are fresh-air intakes ("nostrils" as Wright called them). (Courtesy of SC Johnson Wax.)

Slide #: **023** *Author ID:* 13.1i *SBSE Slide ID:* CD015-023-S001-127
Title: Figure 13.1i, (Page 363)
Comments: Glazing dematerialized the upper walls and ceiling of the Johnson Wax Administration Building. (Courtesy of SC Johnson Wax.)

Slide #: **024** *Author ID:* 13.1k *SBSE Slide ID:* CD015-024-S001-128
Title: Figure 13.1k, (Page 364)
Comments: Interior of Notre Dame du Haut. (Photograph by William Gwin.)

Slide #: **025** *Author ID:* 13.1l *SBSE Slide ID:* CD015-025-S001-129
Title: Figure 13.1l, (Page 364)
Comments: Slit openings in the light scoops are seen in this rear view of a model built by Simon Piltzer at the University of Southern California.

Slide #: **026** *Author ID:* 13.10c *SBSE Slide ID:* CD015-026-S001-130
Title: Figure 13.10c, (Page 376)
Comments: Strip or ribbon windows, as seen here in the Maison LaRoche by Le Corbusier, admit a uniform light, which is further improved by placing the windows high on the wall. (Note that photographic film exaggerates brightness ratios.) Photograph by William Gwin.

Slide #: **027** *Author ID:* 13.10h *SBSE Slide ID:* CD015-027-S001-131
Title: Figure 13.10h, (Page 377)
Comments: Trees, supported on a grid of wires, filter the light before it enters the Kimbell Art Museum. Louis I. Kahn, architect.

Slide #: **028** *Author ID:* 13.11g *SBSE Slide ID:* CD015-028-S001-132
Title: Figure 13.11g, (Page 381)
Comments: Thin, metal light shelves are supported by cables. The top of the shelf is a high-reflectance white, while the rest is painted a bright yellow. The photo was taken before the indoor light shelves were installed.

Slide #: **029** *Author ID:* 13.14g *SBSE Slide ID:* CD015-029-S001-133
Title: Figure 13.14g, (Page 386)
Comments: In the Kimbell Art Museum, Fort Worth, TX, Louis I. Kahn very successfully used daylight fixtures to diffuse light and to eliminate direct glare.

Slide #: **030** *Author ID:* 13.14h *SBSE Slide ID:* CD015-030-S001-134
Title: Figure 13.14h, (Page 387)
Comments: All gallery spaces in the Menil Collection designed by Renzo Piano are daylit except for those under the second story. However, the color of the daylight varies for those areas in direct sunlight and those areas in shade that are receiving only skylight.

Slide #: **031** *Author ID:* 13.14i *SBSE Slide ID:* CD015-031-S001-135
Title: Figure 13.14i, (Page 387)
Comments: The skylights in the Menil Collection are above the baffles which allow only soft, diffused daylight to enter.

Slide #: **032** *Author ID:* 13.14m *SBSE Slide ID:* CD015-032-S001-136
Title: Figure 13.14m, (Page 387)
Comments: Highly reflective glazing and a gossamer space frame filter the light entering the Crystal Cathedral, Garden Grove, CA, by Johnson and Burgee.

Slide #: **033** *Author ID:* 13.14n *SBSE Slide ID:* CD015-033-S001-137
Title: Figure 13.14n, (Page 388)
Comments: Overheating problems in the Crystal Cathedral, Garden Grove, CA, are minimized by the highly reflective glazing and large sections of window-wall that can be opened. Only one of many operable panels is open (see left center).

Slide #: **034** *Author ID:* 13.14o *SBSE Slide ID:* CD015-034-S001-138
Title: Figure 13.14o, (Page 388)
Comments: For a dramatic effect, I. M. Pei allowed direct sunlight to enter the central circulation space of the East Wing, National Gallery of Art, Washington, DC.

Slide #: **035** *Author ID:* 13.15a *SBSE Slide ID:* CD015-035-S001-139
Title: Figure 13.15a, (Page 389)
Comments: These south-facing clerestories illuminate classrooms at the Durant Middle School, Raleigh, NC. The sawtooth arrangement keeps one clerestory from shading the next, and the sloped ceiling more efficiently directs the light down. (Innovative Design, Architect.

Slide #: **036** *Author ID:* 13.15c *SBSE Slide ID:* CD015-036-S001-140
Title: Figure 13.15c, (Page 389)
Comments: These light scoops on the roof of the Florida Solar Energy Center in the town of Cocoa face north because passive solar heating is not required for this building in that climate.

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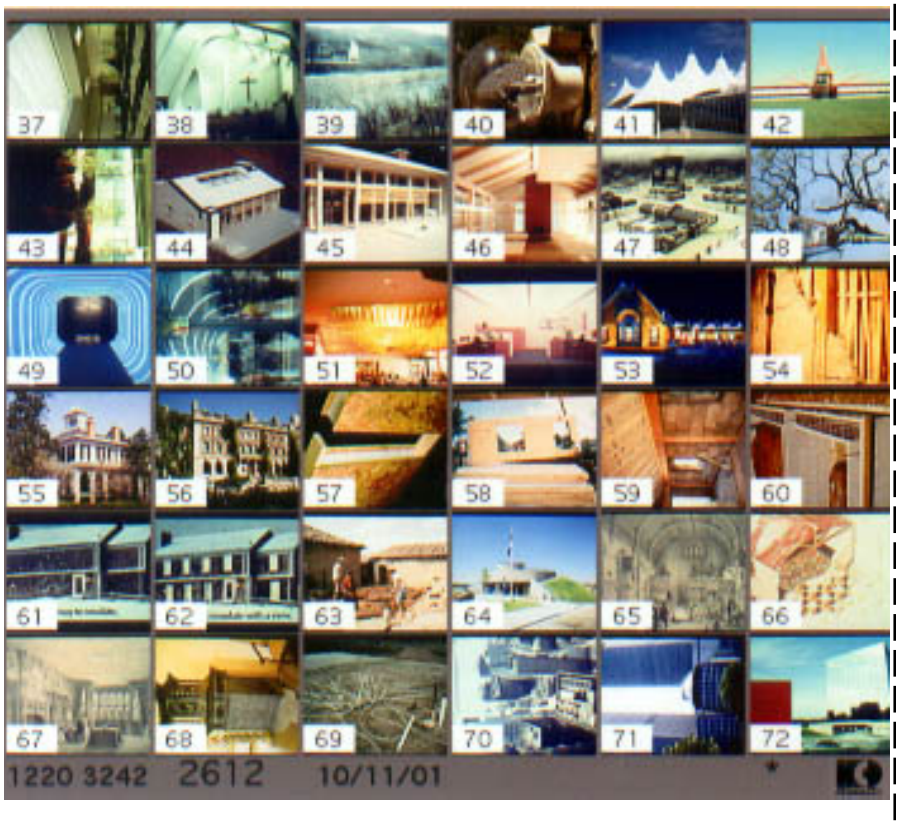

Slide #: **037** *Author ID:* 13.15i *SBSE Slide ID:* CD015-037-S001-141
Title: Figure 13.15i, (Page 391)
Comments: These cloth baffles prevent glare and diffuse the light entering from a south-facing clerestory at the Durant Middle School, Raleigh, NC. (Innovative Design, Architect.)

Slide #: **038** *Author ID:* 13.15o *SBSE Slide ID:* CD015-038-S001-142
Title: Figure 13.15o, (Page 393)
Comments: Clerestories can also be used in the form of light scoops. The Parochial Church of Riola, Italy (1978), designed by Alvar Aalto, uses bent concrete frames to support the roof and to block the glare from the light scoops. (Photograph by William Gwin.)

Slide #: **039** *Author ID:* 13.15q *SBSE Slide ID:* CD015-039-S001-143
Title: Figure 13.15q, (Page 394)
Comments: The light scoops of the Parochial School of Riola, Italy, collect constant and cool north light. (Photograph by Clark Lundell.)

Slide #: **040** *Author ID:* 13.16d *SBSE Slide ID:* CD015-040-S001-144
Title: Figure 13.16d, (Page 396)
Comments: This commercially available heliostat feeds sunlight into a fiberoptic bundle to illuminate a series of small displays indoors.

Slide #: **041** *Author ID:* 13.17b *SBSE Slide ID:* CD015-041-S001-145
Title: Figure 13.17b, (Page 398)
Comments: Overheating is minimized because more than 90 percent of sunlight is reflected off the white membrane. The high ceiling enables the heat to rise, which is an advantage in the summer but a disadvantage in the winter.

Slide #: **042** *Author ID:* 13.17d-1 *SBSE Slide ID:* CD015-042-S001-146
Title: Figure 13.17d-1, (Page 399)
Comments: Translucent and insulated composite walls provide increased lighting by day and a spectacular luminescent architecture by night. (PA Technology, Princeton, NJ, by Richard Rogers, Kelbaugh & Lee Architects, photographs courtesy Kalwall Corporation.

Slide #: **043** *Author ID:* 13.17d-2 *SBSE Slide ID:* CD015-043-S001-147
Title: Figure 13.17d-2, (Page 399)
Comments: Translucent and insulated composite walls provide increased lighting by day and a spectacular luminescent architecture by night. (PA Technology, Princeton, NJ, by Richard Rogers, Kelbaugh & Lee Architects, photographs courtesy Kalwall Corporation.

Slide #: **044** *Author ID:* 13.19a *SBSE Slide ID:* CD015-044-S001-148
Title: Figure 13.19a, (Page 401)
Comments: Daylighting model of a library built as a school project at Auburn University, School of Architecture, by S. Eternadi, T. Peters, and C. Scaglione.

Slide #: **045** *Author ID:* 13.19b *SBSE Slide ID:* CD015-045-S001-149
Title: Figure 13.19b, (Page 401)
Comments: A part of the library's roof is lifted off to show the interior.

Slide #: **046** *Author ID:* 13.19c *SBSE Slide ID:* CD015-046-S001-150
Title: Figure 13.19c, (Page 401)
Comments: This photograph through a view port shows the quality of the daylighting. Glare, excessive brightness ratios (puddles of sunlight), and the general lighting atmosphere are all easily and accurately determined.

Slide #: **047** *Author ID:* 13.19e *SBSE Slide ID:* CD015-047-S001-151
Title: Figure 13.19e, (Page 403)
Comments: This view of the inside of a mirror sky shows how a standard overcast sky is created, but it also shows the confusing images that multiple mirrors cast.

Slide #: **048** *Author ID:* 14.1c *SBSE Slide ID:* CD015-048-S001-152
Title: Figure 14.1c, (Page 408)
Comments: The mantles can be seen in this two-burner street light in old Mobile, AL. Lamplighters used to turn the gas on and off. Today, gaslights are wasteful because there is no economic way to turn them on and off every day.

Slide #: **049** *Author ID:* 14.5e *SBSE Slide ID:* CD015-049-S001-153
Title: Figure 14.5e, (Page 414)
Comments: Neon lights help define the entrance way into this office building on John Street in New York City.

Slide #: **050** *Author ID:* 14.5f *SBSE Slide ID:* CD015-050-S001-154
Title: Figure 14.5f, (Page 415)
Comments: Cold-cathode tubes used for both form generation and illumination in the Town Center, Boca Raton, FL. (Courtesy of National Cathode Corporation.)

Slide #: **051** *Author ID:* 14.10d *SBSE Slide ID:* CD015-051-S001-155
Title: Figure 14.10d, (Page 420)
Comments: One-way baffles are effective only when people are limited to viewing the ceiling from one direction. For example, in a corridor, the baffles should be oriented perpendicular to the length of the corridor. Use eggcrates when shielding is required in two directions.

Slide #: **052** *Author ID:* 14.11e *SBSE Slide ID:* CD015-052-S001-156
Title: Figure 14.11e, (Page 423)
Comments: Ambient lighting from pendent indirect luminaires. (Courtesy of Peerless Lighting Corporation.)

Slide #: **053** *Author ID:* 15.1c *SBSE Slide ID:* CD015-053-S001-157
Title: Figure 15.1c, (Page 434)
Comments: Thermograms can pinpoint the weakness in the thermal envelope. White indicates the warmest areas, which are a result of the greatest heat loss. [Vanscan (Thermogram) by Daedalus Enterprises, Inc.]

Slide #: **054** *Author ID:* 15.1e *SBSE Slide ID:* CD015-054-S001-158
Title: Figure 15.1e, (Page 435)
Comments: The traditional wattle-and-daub construction, so popular in old England, was unacceptable in the harsh climate of America. There was little insulation to counter heat flow, and infiltration was a major problem, as can be seen from the cracks.

Slide #: **055** *Author ID:* 15.4 *SBSE Slide ID:* CD015-055-S001-159
Title: Figure 15.4, (Page 439)
Comments: White is the traditional and appropriate color in the hot and humid Southeast. This nineteenth century home in Eufaula, AL, uses just about every strategy available for summer comfort.

Slide #: **056** *Author ID:* 15.5b *SBSE Slide ID:* CD015-056-S001-160
Title: Figure 15.5b, (Page 440)
Comments: Like most palaces throughout time, the Andrew Carnegie mansion on Fifth Avenue in New York City is a spacious, ornate, but compact building.

Slide #: **057** *Author ID:* 15.7g *SBSE Slide ID:* CD015-057-S001-161
Title: Figure 15.7g, (Page 450)
Comments: Structural insulated panels (SIP) have eliminated many heat bridges by eliminating all studs. (Courtesy R-Control Building Systems.)

Slide #: **058** *Author ID:* 15.7f *SBSE Slide ID:* CD015-058-S001-162
Title: Figure 15.7f, (Page 450)
Comments: Structural insulated panels (SIP) create very high-quality thermal envelopes because of high R-value and low infiltration. (Courtesy R.Control Building Systems.)

Slide #: **059** *Author ID:* 15.7h *SBSE Slide ID:* CD015-059-S001-163
Title: Figure 15.7h, (Page 451)
Comments: The straw bales are generally used as in-fill panels, much as in half- timbered construction.

Slide #: **060** *Author ID:* 15.7j *SBSE Slide ID:* CD015-060-S001-164
Title: Figure 15.7j, (Page 451)
Comments: Insulating concrete forms (ICF) serve as both formwork and permanent insulation. Although mostly used for foundations, the forms are also used to build full-height walls.

Slide #: **061** *Author ID:* 15.8d-1 *SBSE Slide ID:* CD015-061-S001-165
Title: Figure 15.8d-1, (Page 453)
Comments: Which building will require less heating energy? Until the 1980's, the building on the left would have had the least heat loss, but with new, very high-performance windows, the building on the right needs the least heating. However, a window manufacturer used these images to sell insulating (i.e., double-glazing) windows. Although double glazing was much better than single glazing, the truth ws that the windowless building still needed less heating. (Courtesy Anderson Corp., Bayport, MN.)

Slide #: **062** *Author ID:* 15.8d-2 *SBSE Slide ID:* CD015-062-S001-166
Title: Figure 15.8d-2, (Page 453)
Comments: Which building will require less heating energy? Until the 1980's, the building on the left would have had the least heat loss, but with new, very high-performance windows, the building on the right needs the least heating. However, a window manufacturer used these images to sell insulating (i.e., double-glazing) windows. Although double glazing was much better than single glazing, the truth ws that the windowless building still needed less heating. (Courtesy Anderson Corp., Bayport, MN.)

Slide #: **063** *Author ID:* 15.10b *SBSE Slide ID:* CD015-063-S001-167
Title: Figure 15.10b, (Page 456)
Comments: Adobe or sun-dried mud bricks are being made in this Mayan village in Guatemala. The best adobe bricks are made of a clay- and straw- mixture. The straw gives the dried brick some strength in tension.

Slide #: **064** *Author ID:* 15.11h *SBSE Slide ID:* CD015-064-S001-168
Title: Figure 15.11h, (Page 462)
Comments: This highway rest stop in Idaho uses earth berms both to deflect the northerly winter winds, and also to deflect the hot summer sun from the east and west facades. South glazing collects winter sun, while a south facing overhang shades the south glazing from the summer sun.

Slide #: **065** *Author ID:* 16.2a *SBSE Slide ID:* CD015-065-S001-169
Title: Figure 16.2a, (Page 472)
Comments: Some royal halls were still heated by an open fire as late as 1300 AD. The Hall of Penhurst Place. (From The Mansions of England in Olden Time by Joseph Nash, Henry Sotheran & Co., 1971.)

Slide #: **066** *Author ID:* 16.2c *SBSE Slide ID:* CD015-066-S001-170
Title: Figure 16.2c, (Page 473)
Comments: Roman hypocaust heating. (Courtesy of Wirsbo Company.)

Slide #: **067** *Author ID:* 16.2d *SBSE Slide ID:* CD015-067-S001-171
Title: Figure 16.2d, (Page 473)
Comments: In England, fireplaces remained popular because of the relatively mild climate. In colder climates, the ceramic stove was preferred. (From The Mansions of England in Olden Time by Joseph Nash, Henry Sotheran & Co., 1971.)

Slide #: **068** *Author ID:* 16.2e *SBSE Slide ID:* CD015-068-S001-172
Title: Figure 16.2e, (Page 474)
Comments: In northern, central, and eastern Europe, masonry and ceramic stoves were used instead of the inefficient fireplace. Cast-iron and steel stoves are even more efficient because they conduct heat faster through the walls; however, the heavy masonry stoves stored heat for all night warmth. In very cold climates like Russia, people would live and sleep on top of very large masonry stoves.

Slide #: **069** *Author ID:* 16.6c *SBSE Slide ID:* CD015-069-S001-173
Title: Figure 16.6c, (Page 479)
Comments: For slab-on-grade, radiant floor heating, the concrete is poured over the plastic tubing. The various heating zones are made with continuous tubing with all joints made above the slab to minimize leaks in the concrete.

Slide #: **070** *Author ID:* 16.12h *SBSE Slide ID:* CD015-070-S001-174
Title: Figure 16.12h, (Page 492)
Comments: In urban areas, cooling towers are typically located on rooftops.

Slide #: **071** *Author ID:* 16.12i *SBSE Slide ID:* CD015-071-S001-175
Title: Figure 16.12i, (Page 492)
Comments: This conical cooling tower is on the roof on one of the World Financial Center buildings in lower Manhattan. The twin towers of the World Trade Center, seen in the background, use the water of the New York City harbor as a heat sink. Large, underground pipes supply and return the warmed, salty water.

Slide #: **072** *Author ID:* 16.12j *SBSE Slide ID:* CD015-072-S001-176
Title: Figure 16.12j, (Page 492)
Comments: The small cube at left is a cooling tower for this office building. Blue Cross and Blue Shield Building, Towson, MD.

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Slide #: **073** *Author ID:* 16.12k *SBSE Slide ID:* CD015-073-S001-177
Title: Figure 16.12k, (Page 493)
Comments: These decorative fountains are used in place of a cooling tower. West Point Pepperell factory, Lanett. AL.

Slide #: **074** *Author ID:* 16.21e *SBSE Slide ID:* CD015-074-S001-178
Title: Figure 16.21e, (Page 516)
Comments: Eero Saarinen used exposed concrete columns to contain mechanical risers in the CBS office tower in New York City.

Slide #: **075** *Author ID:* 16.21h *SBSE Slide ID:* CD015-075-S001-179
Title: Figure 16.21h, (Page 517)
Comments: Exposing the mechanical equipment can add richness and complexity to architecture. Occupational Health Center, Columbus, IN, by Hardy, Holzman, Pfeiffer. (Courtesy of Cummins Corporation.)

Slide #: **076** *Author ID:* 16.21i *SBSE Slide ID:* CD015-076-S001-180
Title: Figure 16.21i, (Page 518)
Comments: The Centre Pompidou, Paris, France, by Richard Rogers and Renzo Piano. Much of the mechanical equipment is exposed on the exterior of the building. (Photograph by Clark Lundell.)

Slide #: **077** *Author ID:* 17.4a *SBSE Slide ID:* CD015-077-S001-181
Title: Figure 17.4a, (Page 533)
Comments: The Emerald People's Utility District Headquarters (Courtesy of WEGROUP PC Architects and Planners, Solar Strategies by John Reynolds Equinox Design Inc.)

Slide #: **078** *Author ID:* 17.5a *SBSE Slide ID:* CD015-078-S001-182
Title: Figure 17.5a, (Page 535)
Comments: The Hood College Resource Management Center. Note the solar collectors on the roof. Architect: Burt Hill Kosar Rittelmann Associates. (Courtesy of Burt Hill Kosar Rittelmann Associates.)

Slide #: **079** *Author ID:* 17.6a *SBSE Slide ID:* CD015-079-S001-183
Title: Figure 17.6a, (Page 538)
Comments: The new center for the Colorado Mountain College. Architect: Peter Dobrovolny. © Robert Benson, photographer.)

Slide #: **080** *Author ID:* 17.6c *SBSE Slide ID:* CD015-080-S001-184
Title: Figure 17.6c, (Page 539)
Comments: A view of the atrium and clerestory windows. (Robert Benson, photographer.)

Slide #: **081** *Author ID:* 17.6h *SBSE Slide ID:* CD015-081-S001-185
Title: Figure 17.6h, (Page 542)
Comments: Summer-day heat rejection and passive cooling by the heat-sink action of the thermal mass. (Courtesy of Peter Dobrovolny, A.I.A.)

Slide #: **082** *Author ID:* 17.7a *SBSE Slide ID:* CD015-082-S001-186
Title: Figure 17.7a, (Page 543)
Comments: Each façade of the Bateson Building is somewhat different because the solar impact is different on each orientation of a building. Note the horizontal louvers in a horizontal plane on the south façade and the apparent lack of shading on the west façade in this morning photograph. In the afternoon, roll-down exterior shades protect the west windows, just as the east windows are protected in the morning (Fig. 17.7b.)

Slide #: **083** *Author ID:* 17.7b *SBSE Slide ID:* CD015-083-S001-187
Title: Figure 17.7b, (Page 544)
Comments: Compare the north and east facades of this photograph with the west and south facades in Fig 17.7a. Note how the east windows are protected from the morning sun.

Slide #: **084** *Author ID:* 17.7c *SBSE Slide ID:* CD015-084-S001-188
Title: Figure 17.7c, (Page 544)
Comments: The automated fabric roller shades on the exterior of east and west windows are guided by vertical support cables.

Slide #: **085** *Author ID:* 17.7d *SBSE Slide ID:* CD015-085-S001-189
Title: Figure 17.7d, (Page 545)
Comments: A large atrium with south-facing clerestories and north-facing skylights brings light to interior offices in the Bateson Building. The prominent stairs invite people to walk rather than use the elevators. Antistratification tubes hand from the atrium roof. (Courtesy of the Office of the California State Architect.)

Slide #: **086** *Author ID:* 17.7e *SBSE Slide ID:* CD015-086-S001-190
Title: Figure 17.7e, (Page 546)
Comments: The steeply sloped clerestories face south (toward the right in the photograph) and the sloped skylights face north. Both the clerestories and skylights have exterior shading devices for solar control. The circles on the atrium roof gables are exhaust fans for night flush cooling. (Courtesy of the Office of the California State Architect.)

Slide #: **087** *Author ID:* 17.10b *SBSE Slide ID:* CD015-087-S001-191
Title: Figure 17.10b, (Page 559)
Comments: The north facade is shaded by the fabric sail-fins. (Courtesy William P. Bruder, Architects, Ltd.)

Slide #: **088** *Author ID:* 17.10c *SBSE Slide ID:* CD015-088-S001-192
Title: Figure 17.10c, (Page 559)
Comments: The sail-fins as seen from inside the north façade. (Courtesy William P. Bruder, Architects, Ltd.)

Slide #: **089** *Author ID:* C.4 *SBSE Slide ID:* CD015-089-S001-193
Title: Figure C.4, (Page 572)
Comments: Alternate model for use for model stand. Note use of sundial.

Slide #: **090** *Author ID:* D.5b *SBSE Slide ID:* CD015-090-S001-194
Title: Figure D.5b, (Page 575)
Comments: The commercially available clinometer is used for finding vertical angles.

Slide #: **091** *Author ID:* D.5c *SBSE Slide ID:* CD015-091-S001-195
Title: Figure D.5c, (Page 575)
Comments: This construction protractor was purchased for about $10.

Slide #: **092** *Author ID:* D.5d *SBSE Slide ID:* CD015-092-S001-196
Title: Figure D.5d, (Page 575)
Comments: Here, the angle-finder is being used to determine the height of an object.

Slide #: **093** *Author ID:* H.5a *SBSE Slide ID:* CD015-093-S001-197
Title: Figure H.5a, (Page 594)
Comments: Mounting the Solar Site Evaluator on a camera tripod is especially helpful when tracing a horizon profile.